I claim:

     1.   A method for determining binding of a receptor to one or more ligands, comprising contacting a collective receptor variant population with said one or more ligands and detecting binding of said one or more ligands to said collective receptor variant population.

     2.   The method of claim 1, further comprising dividing said collective receptor variant population into two or more subpopulations, contacting one or more of said two or more subpopulations with said one or more ligands and detecting one or more receptor variant subpopulations having binding activity to said one or more ligands.

     3.   The method of claim 2, wherein said dividing, contacting and detecting are repeated one or more times.

     4.   The method of claim 3, wherein said detecting identifies a receptor variant having binding activity to said one or more ligands.

     5.   The method of claim 4, wherein said detecting identifies a receptor variant having optimal binding activity to said one or more ligands.

     6.   The method of claim 1, wherein said receptor variant population is recombinantly expressed in cells.

     7.   The method of claim 6, wherein said cells are melanophores.

8.   The method of claim 1, further comprising dividing said collective receptor variant population into two or more subpopulations, contacting said two or more subpopulations with said one or more ligands and detecting one or more receptor variant subpopulations having binding activity to said one or more ligands.

9.   The method of claim 1, further comprising isolating an individual receptor variant having binding activity to said one or more ligands, wherein said receptor variant is linked to an identifiable tag.

10.   A method for determining binding of a ligand to one or more receptors, comprising contacting a collective ligand variant population with said one or more receptors and detecting binding of said one or more receptors to said collective ligand variant population.

11.   The method of claim 10, further comprising dividing said collective ligand variant population into two or more subpopulations, contacting one or more of said two or more subpopulations with said one or more receptors and detecting one or more ligand variant subpopulations having binding activity to said one or more receptors.

12.   The method of claim 11, wherein said dividing, contacting and detecting are repeated one or more times.

13.   The method of claim 12, wherein said detecting identifies a ligand variant having binding activity to said one or more receptors.

14.   The method of claim 13, wherein said detecting identifies a ligand variant having optimal binding activity to said one or more receptors.

15.   The method of claim 10, wherein said
5   ligand variant population is recombinantly expressed in cells.

16.   The method of claim 15, wherein said cells are melanophores.

17.   The method of claim 10, further comprising
10   isolating an individual ligand variant having binding activity to said one or more ligands, wherein said ligand variant is linked to an identifiable tag.

18.   The method of claim 10, further comprising dividing said collective ligand variant population into
15   two or more subpopulations, contacting said two or more subpopulations with said one or more receptors and detecting one or more ligand variant subpopulations having binding activity to said one or more receptors.

19.   A method for determining binding of a
20   ligand to a receptor or a variant thereof, comprising contacting a collective ligand population with said receptor or variant thereof and detecting binding of said receptor or variant thereof to said collective ligand population.

25   20.   The method of claim 19, further comprising dividing said collective ligand population into two or more subpopulations, contacting one or more of said two or more subpopulations with said receptor or variant thereof and detecting one or more ligand subpopulations

having binding activity to said receptor or variant thereof.

21. The method of claim 20, wherein said dividing, contacting and detecting are repeated one or 5 more times.

22. The method of claim 21, wherein said detecting identifies a ligand variant having binding activity to said receptor or variant thereof.

23. The method of claim 22, wherein said 10 detecting identifies a ligand variant having optimal binding activity to said receptor or variant thereof.

24. The method of claim 19, wherein said collective ligand population contains ligand variants.

25. The method of claim 19, further comprising 15 dividing said collective ligand population into two or more subpopulations, contacting said two or more subpopulations with said receptor or variant thereof and detecting one or more ligand subpopulations having binding activity to said receptor or variant thereof.

20   26. A method for identifying an optimal binding ligand variant for a receptor, comprising:

(a) contacting a collective receptor variant population or subpopulation thereof with a ligand population;

25   (b) detecting binding of one or more ligands in said ligand population to said collective receptor variant population or subpopulation thereof;

(c) dividing said ligand population into subpopulations; and

(d) repeating optionally each of steps (a) to (c), wherein said ligand subpopulation in step (c) comprises two or more ligands and is used as said ligand population in step (a) and wherein said detecting in step (b) identifies one or more ligands having binding activity to said collective receptor variant population.

27. The method of claim 26, further comprising the steps:

(e) generating a library of variants of said ligand identified in step (d);

(f) contacting a parent receptor with each of said ligand variants; and

(g) detecting the binding of one or more ligand variants to said parent receptor.

28. The method of claim 26, wherein step (d) further comprises comparing the binding activity of said one or more ligands having binding activity to said receptor variant population.

29. The method of claim 28, wherein said comparing identifies a ligand having optimal binding activity to said collective receptor variant population.

30. The method of claim 27, wherein said step (g) further comprises comparing the binding activity of said one or more ligand variants having binding activity to said parent receptor.

31.   The method of claim 30, wherein said comparing identifies a ligand having optimal binding activity to said parent receptor.

32.   A method for identifying an optimal
5   binding ligand variant to a receptor, comprising:

(a)   contacting two or more subpopulations of a collective receptor variant population with individual ligands from a ligand population;

(b)   detecting binding of one or more
10   individual ligands to one or more of said subpopulations of said collective receptor variant population;

(c)   dividing at least one of said subpopulations of said collective receptor population which exhibits binding activity to said individual
15   ligands into two or more new subpopulations; and

(d)   repeating optionally each of steps (a) to (c), said two or more new subpopulations in step (c) comprising two or more receptor variants and said new subpopulations used as said two or more subpopulations of
20   a collective receptor variant population in step (a), wherein said detecting in step (b) identifies one or more individual ligands having binding activity to one or more new subpopulations of subpopulations of said collective receptor variant population.

25   33.   The method of claim 32, further comprising the steps:

(e)   contacting a closely related receptor variant subpopulation comprising a parent receptor or a

closely related variant thereof with one or more
individual ligands identified in step (d);

      (f) detecting binding of said one or more
individual ligands to said closely related receptor
5   variant subpopulation; and

      (g) comparing the binding activity of said one
or more ligands having binding activity to said closely
related receptor variant subpopulation, wherein said
comparing identifies a ligand having optimal binding
10   activity to said closely related receptor variant
subpopulation.

      34. The method of claim 33, further comprising
the steps:

      (h) generating a library of variants of said
15   ligand identified in step (g);

      (I) contacting said parent receptor with each
of said ligand variants; and

      (j) detecting binding of one or more ligand
variants to said parent receptor.

20   35. The method of claim 32, wherein step (d)
further comprises comparing the binding activity of said
one or more ligands having binding activity to said
closely related receptor variant population.

      36. The method of claim 35, wherein said
25   comparing identifies a ligand having optimal binding
activity to said collective receptor variant population.

37. The method of claim 34, wherein said step (j) further comprises comparing the binding activity of said one or more ligand variants having binding activity to said parent receptor.

5   38. The method of claim 37, wherein said comparing identifies a ligand having optimal binding activity to said parent receptor.